

High Performance Methane Thrust Chamber (HPMTC), Phase I

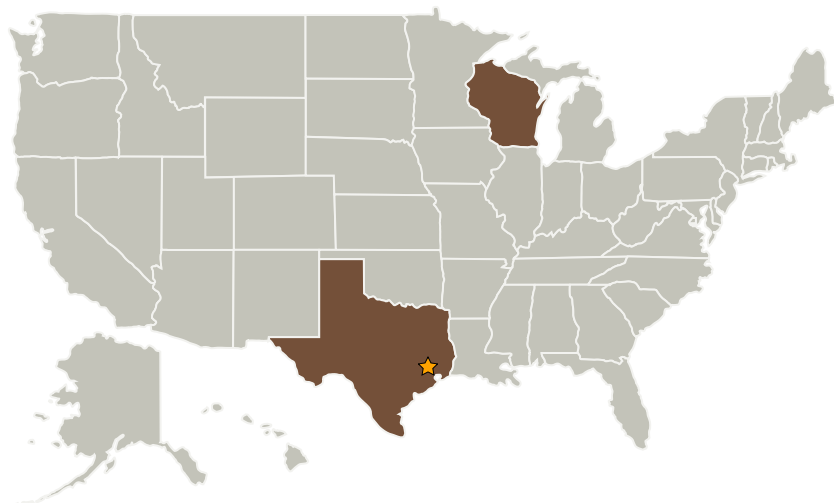
Completed Technology Project (2006 - 2006)



Project Introduction

ORBITEC proposes to develop a High-Performance Methane Thrust Chamber (HPMRE) to meet the demands of advanced chemical propulsion systems for deep-space mission applications. The HPMTC utilizes a unique propellant injector to generate a coaxial vortex flow field in the combustion chamber. Propellant mixing and burning are confined to the core vortex, while the cool outer vortex provides convective cooling to counter the effects of thermal radiation. The HPMTC will utilize an optimized combustion chamber geometry and propellant injectors to maximize performance and minimize wall heating. Avoiding severe thermal cycling of the chamber will provide very long engine lifetime and allow for simple, lightweight chamber designs. The coaxial vortices also provide an extended flow path longer than the geometric length of the chamber. The enhanced shear mixing can produce high combustion efficiencies. Phase I tasks include propulsion system analysis, thrust chamber fabrication, hot-fire testing with methane using both GOX and LOX, data analysis, scaling effects analysis, and development of plans for Phase II activities.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Orbital Technologies Corporation	Supporting Organization	Industry Women-Owned Small Business (WOSB)	Madison, Wisconsin

Primary U.S. Work Locations

Texas	Wisconsin
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.1 Chemical Space Propulsion
 - └ TX01.1.3 Cryogenic